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المجلة العراقية لبحوث السوق وحماية المستهلك

EFFECT OF ADDING DIFFERENT LEVELS OF DILL SEEDS TO THE DIET ON PHYSIOLOGICAL TRAITS OF BROILERS

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ABSTRACT

This study was conducted in the poultry field of the department of animal production, college of agricultural engineering sciences, university of Baghdad for the period from 10/15/2021 to 11/25/2021 with the aim of showing the effect of adding different levels of dill seeds to the diet on productive and carcass traits For broiler meat. In this study, 200 unsexed broiler chicks of breed (Ross 308) were used, one day age, with a starting weight of 41.46 g. The chicks were randomly distributed to 5 treatments, and each treatment included 4 replicates, 10 birds for each replicate. The birds were fed three diets: the starter diet, the growth diet and the final diet. The experiment treatments were T1, T2, T3, T4 and T5, adding dill seeds at average 0, 0.3, 0.6, 0.9 and 1.2%, respectively. The results of the experiment indicated a significantly (P<0.05) excelled in cholesterol concentration at 42 d of age for treatment T4 compared with T2, and treatment T1 compared with treatment T2 in the level of triglycerides. Significantly excelled (P<0.05) was observed when calculating the high-density lipoproteins for the two treatments T3 and T4 compared with T5. Also, treatment T1 excelled on treatment T2 in the concentration of very low-density lipoproteins, and a significant decrease (P<0.01) in the level of MDA at 42 d of age was noted in favor of the addition treatments.

Keywords: Dill seeds, broiler, physiological traits.

تأثير إضافة مستويات مختلفة من بذور الشبت الى العليقة في بعض الصفات الفسلجية لفروج اللحم

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الخلاصة

أجريت هذه الدراسة في حقل الدواجن التابع لقسم الإنتاج الحيواني، كلية علوم الهندسة الزراعية، جامعة بغداد للمدة من 2021/10/15 لغاية 2021/11/25 بهدف بيان تأثير إضافة مستويات مختلفة من بذور الشبت الى العليقة في بعض الصفات الفسلجية لفروج اللحم، واستعمل في هذه الدراسة 200 فروج لحم من سلالة (Ross 308) بعمر يوم واحد وبوزن ابتدائي ٤١.٤٦ غم، وجرى توزيع الافراخ عشوائيا على 5 معاملات تضمنت كل معاملة 4 مكررات بواقع 10 طير لكل مكرر، وغذيت الطيور على ثلاث علائق شملت كل من عليقة البادئ والنمو والنهائي، وكانت معاملات تجربة T1 وT2 وT3 وT4 وT5 إضافة بذور الشبت بنسب 0 و0.3 و0.6 و0.9 و1.2% على التوالي، وأشارت نتائج التجربة الى وجود تفوق معنوي (P<0.05) في تركيز الكولسترول عند عمر 42 يوما للمعاملة T4 مقارنة مع T2 كما تفوقت المعاملة T1 مقارنة مع المعاملة T2 في مستوى الدهون الثلاثية، ويلاحظ وجود تفوق معنوي (P<0.05) عند حساب البروتينات الدهنية عالية الكثافة للمعاملتين T3 وT4 مقارنة مع T5، كما تفوقت المعاملة T1 على المعاملة T2 في تركيز البروتينات الدهنية واطئة الكثافة جدا، كما يلاحظ انخفاض معنوي (P<0.01) في مستوى MDA عند عمر 42 يوما لصالح معاملات الاضافة.

الكلمات المفتاحية: بذور الشبت، فروج اللحم، الصفات الفسلجية.

INTRODUCTION

Poultry meat is one of the food sources used to raise the people's consumption rate of animal protein because it is rich in protein, and for this purpose, It mainly used broiler used for meat consumption only **(Al-Fayyad & Naji, 2012)**. Natural medicinal plants have many advantages. They are safe and have beneficial effects in feeding poultry through increasing feed consumption, improving the secretion of digestive enzymes, secretion of appetite, and stimulating immunity, as well as their antiviral, antibacterial and antioxidant activity **(Abadi & Andi, 2014)**. Plants contain many important basic components such as fatty acids, proteins and carbohydrates as well as other substances called Secondary Plant substances that derived from primary metabolic compounds and they are a continuation of the metabolic activities important for plant growth **(Harborne, 1984)**. One of these medicinal plants is Dill (*Anethum graveolens*) belonging to the Apiaceae family, which includes approximately 400-300 genera and 3750-3000 species. It is widespread in Iran, Asia Minor, North Africa, as well as the eastern and western Mediterranean **(Poras *et al.*, 2006)**. As well as containing volatile oils, phenolic acids, many vitamins such as niacin and pyridoxine and minerals such as potassium, calcium, copper, manganese and iron **(Al-Ismail & Aburjai, 2004)**. The dill seeds have a pleasant aromatic smell, are flat, smaller and lighter. Dill seeds are used to calm nerves, relieve chronic headaches, treat fatigue, and lower blood pressure **(Jana & Shekhawat, 2010)**. they are lowering cholesterol in the blood **(Yazdamparast & Bahramikia, 2008)**. The active compounds of dill seeds ara carvone and limonene, have antioxidant effects **(Chahal *et al.*, 2017)**, To study aimed to the effect of adding different levels of dill seeds to the broiler diet on the physiological traits.

MATERIALS AND METHODS

This study was conducted in the poultry field of the department of animal production, college of agricultural engineering sciences, university of Baghdad for period from 10/15/2021 to 11/25/2021. In this study, we used 200 (Ross 308) broiler chicks prepared from the hatchery of Al-Shakr Al-Ahlia company for the production of broilers in the Abu Ghraib district, Baghdad at the age of one day were used. Chicks were randomly distributed to 5 treatments, and each treatment included 4 replicates, 10 birds for each replicate, with an average starting weight of 41.46 g. All chicks were fed a free diet (ad-libitum), (Table 1), The experimental treatments from 1 d old were divided as follows:

1. (T1): a control treatment without addition.
2. (T2): adding dill seeds to diet at an average of 0.3%.
3. (T3): adding dill seeds to diet at average of 0.6%.
4. (T4): adding dill seeds to the bush at a rate of 0.9%.
5. (T5): adding dill seeds to diet at an average of 1.2%.

Dill seeds was purchased from the local market. The chemical analysis of dill seeds was conducted in the laboratory of the department of environment and water, Ministry Science and Technology as shown in (Table 2). At the end of the experiment at the age of 42 d, 2 birds were taken from each replicate (male and female) for each treatment was slaughtered randomly. Blood samples were collected in tubes that did not contain anticoagulant and were placed in a centrifuge at 3500 rpm for 15 min to separate the serum from the cellular fraction and kept and frozen at a temperature of (-20°C) until the following tests were performed. For the purpose of estimating the levels of total protein, albumin and globulin according to the equation mentioned **(Hemry *et al.*, 1974)**, cholesterol, triglycerides, HDL, LDL, VLDL **(Bablock, 1988**) and the enzymes ALT, AST, ALP and Malone Didehyde (MDA).

Statistical analysis was conducted according to a complete randomize design (CRD) to analyze the effect of different treatments on the studied traits, and the significant differences between the means were compared with **Duncan test (1955)** and **SAS (2012)** was used in the statistical analysis.

Table(1): Percentages of the ingredients of the diets used in the experiment and their chemical composition.

Feed material	Starter diet (1-10) d	Growth diet (11-24) d	Final diet(11-24) d
Yellow corn	43.8	44.6	46.5
Wheat	14	15.4	16
Soybean meal 48(%)	32.7	29.1	26
Protein Concentrate (1)	5	5	5
Sunflower oil	2.2	3.5	4.4
Limestone	1.1	1.5	1.3
Dicalcium Phosphate DCP	0.7	0.4	0.3
Salt	0.3	0.3	0.3
Vitamins & Minerals Blend (2)	0.2	0.2	0.2
Total	100	100	100
Computed chemical analysis			
Crude protein (%)	23.03	21.53	20.27
Represented energy (kilo calories/kg of feed)	3005.83	3105.47	3193.20
Lysine (%)	1.3	1.22	1.13
Methionine+Cysteine (%)	0.88	0.84	0.80
Calcium (%)	0.86	0.93	0.82
Available phosphorous (%)	0.52	0.46	0.44

The chemical analysis of the diets was calculated according to the **NRC (1994)**. brocon-5 special W protein concentrate. Each kg contains: 40% crude protein, 5% fat, 2.2% fiber, 24.52% ash, 3.53% calcium, 5.35% phosphorous, 3.85% lysine, 3.7% methionine, 4.12% methionine+cysteine, 0.43% tryptophan, 2.57% Arginine, 2.4% Sodium, 2107 kcal/kg represented energy, 200,000 IU vitamin A, 60,000 IU vitamin D3, 600 mg vitamin E, 50% vitamin K3, 60 mg vitamin B1, 140 mg vitamin B2, 80 mg vitamin B6, 700 mg vitamin B12, 800 mg niacin, 20 mg folic acid, 1 mg iron, 200 mg copper, 1.6 mg manganese, 1.2 mg zinc, 20 mg iodine, 5 mg selenium. A mixture of vitamins and minerals, each kg of which contains: 500 IU vitamin A, 600 IU D3, 10 mg E, 2 mg K3, 2 mg B1, 2 mg B2, 2 mg B6, 5 Mg B12, 10 mg C, 15 mg folic acid, 500 mg niacin.

Table (2): Chemical analysis of dill seeds used in the experiment**.**

Chemical analysis	(%)
Protein	١٤.٢
ash	٧.١
Fats	١٣.٩
Humidity	٥.٩
raw fiber	٢٠.٩
carbohydrates	٣٨.٠
limonene	١٨.٢٢
carvone	٤٠.٠٥
Beta-Ciamin	١٢.٠

RESULTS AND DISCUSSION

The results in (Table 3) indicate that there are no significant differences between the treatments when calculating the concentrations of total protein, albumin and globulin in blood .

Table (3): Effect of adding different levels of dill seeds to (Ross 308) broiler diets on the concentration of blood proteins (g/100 mL) at 42 d of age (mean ± standard error).

Treatments	Traits		
	Total protein	Albumin	Globulin
T1	2.92 ± 0.19	1.52 ± 0.07	1.40 ± 0.12
T2	2.56 ± 0.05	1.35 ± 0.04	1.20 ±0.08
T3	2.82 ± 0.18	1.46 ± 0.07	1.36 ± 0.11
T4	2.83 ± 0.08	1.47 ± 0.05	1.36 ± 0.06
T5	2.84 ± 0.10	1.41 ± 0.03	1.43 ± 0.07
Significant level	N.S	N.S	N.S

T1: Control treatment without addition.
T2: Add dill seeds at the rate of 0.3%.
T3: Add dill seeds at an average of 0.6%.
T4: Add dill seeds at an average of 0.9%.
T5: Add dill seeds at an average of 1.2%.
N.S: There are no significant differences between the average treatments.

The results in (Table 4) showed that there were no significant differences between the treatments in the concentration of AST, ALT and ALP enzymes.

Table (4): Effect of adding different levels of dill seeds to broiler diets (Ross 308) on serum enzyme levels (international units/L) at 42 d of age (mean±standard error).

Treatments	Traits		
	AST	ALT	ALP
T1	132.00 ± 21.43	57.00 ±3.29	3092.25 ± 286.81
T2	182.75 ± 29.67	48.00 ± 4.41	2862.75 ± 333.10
T3	170.25 ± 16.59	56.00 ± 4.12	3447.00 ± 217.37
T4	150.75 ± 15.78	54.50 ± 3.37	3268.00 ± 423.69
T5	144.75 ± 38.31	55.00 ± 2.91	3041.00 ± 362.87
Significant level	N.S	N.S	N.S

T1: Control treatment without addition.
T2: Add dill seeds at the rate of 0.3%.
T3: Add dill seeds at an average of 0.6%.
T4: Add dill seeds at an average of 0.9%.
T5: Add dill seeds at an average of 1.2%.
N.S: There are no significant differences between the average treatments.

It is noted from (Table 5) that there are no significant differences between treatments in low-density lipoproteins at 42 d of age. While there were significant differences between the treatments ($P<0.05$) when calculating cholesterol concentration, it was noted that the fourth treatment T4 was significantly superior to the second treatment T2, while it did not differ significantly from the treatments T1, T3, and T5. When calculating the triglycerides, it was noticed that the first treatment T1 was significantly superior to the second treatment T2 significantly lower than T1 and no differences between other treatments and control group. results of the table also indicate that when calculating high-density lipoproteins, the two treatments T3 and T4 significantly excelled on the fifth treatment T5, while they did not differ significantly with the two treatments T1 and T2. When calculating very low-density lipoproteins, it was noticed that the control treatment T1 significantly excelled on the second treatment T2, while it did not T2 significantly lower than T1 and all treatments.

Table (5): Effect of adding different levels of dill seeds to (Ross 308) broiler diets on blood profile concentrations (mg/100 mL) at 42 d of age (mean±standard error).

Treatments	Traits				
	Cholesterol	Triglycerides	HDL	LDL	VLDL
T1	103.00±3.02ab	69.50 ± 9.74 a	57.75±3.03 ab	31.35±0.88	1.3.90±1.94 a
T2	89.00 ± 1.29 b	38.75 ±3.88 b	53.25±0.85 ab	28.00±0.45	7.75±0.77 b
T3	101.00±1.47ab	47.00±6.36 ab	60.50±1.32 a	31.10±1.63	9.40±1.27 ab
T4	111.25± 7.56a	61.25±8.17 ab	62.25±2.62a	36.75±5.79	12.25±1.63 ab
T5	94.25±8.39 ab	54.75±7.00 ab	50.75±4.49b	32.55±3.58	10.95±1.40 ab
Significant level	*	*	*	N.S	*

T1: Control treatment without addition.
T2: Add dill seeds at the rate of 0.3%.
T3: Add dill seeds at an average of 0.6%.
T4: Add dill seeds at an average of 0.9%.
T5: Add dill seeds at an average of 1.2%.
***: The averages bearing different letters for the same column indicate that there are significant differences between the mean of the treatments at the level (P<0.05).**
N.S: There are no significant differences between the average treatments.

When measuring the level of Malondialdehyde (MDA), it is noticed from the data shown in (Table 6) that there are significant differences between treatments (P<0.01) in the level of MDA at 42 d of age, decreased in treatments T2, T3 and T4 compared to the control treatment T1.

Table (6): The effect of adding different levels of dill seeds to the diets of 308 Ross broilers on the level of malondidehyde (µmol /mL) at 42 d of age (mean±standard error.).

Treatments	MDA
T1	1.35 ± 0.13 a
T2	0.96 ± 0.03 b
T3	0.87 ± 0.08 b
T4	0.92 ± 0.10 b
T5	1.14 ± 0.09 ab
Significant level	**

T1: Control treatment without addition.
T2: Add dill seeds at the rate of 0.3%.
T3: Add dill seeds at an average of 0.6%.
T4: Add dill seeds at an average of 0.9%.
T5: Add dill seeds at an average of 1.2%.
****: The averages bearing different letters for the same column indicate that there are significant differences between the mean of the treatments at the level (P<0.01).**

The decrease in blood cholesterol may be attributed to T2 treatment, possibly due to the decrease in hepatic cholesterol enzymes such as 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CO.A) reductase, cholesterol-7-hydroxylase, and fatty acid synthase **(Zhang *et al.*, 2007)**. As for the apparent increase in the concentration of high-density lipoproteins (HDL) in the treatment of adding dill seeds, it may be attributed to the polyunsaturated fatty acids that increase the binding of high-density lipoproteins (HDL) while stimulating the excretion of cholesterol outside the body and liver membranes **(Terpstra *et al.*, 2000)** on the other hand, high-density lipoproteins (HDL) work to transfer cholesterol reversely from different body tissues and return it to the liver and then convert it to bile acids **(Van der Steeg, 2008)**. The significant decrease in the concentration of triglycerides in the blood serum of broilers for treatments of adding dill seeds compared to the control treatment is due to the presence of soluble fibers in the seeds of dill, which reduces the absorption of triglycerides and inhibits the re-absorption of bile acids and its excretion with excreta, which increases the viscosity of the

food mass forming a gel sticky **(North *et al.*, 2009)**. The polyunsaturated fatty acid-rich oils of dill seeds may have increased the average of oxidation of polyunsaturated fatty acids in the liver causing a decrease in plasma triglycerides **(Shunthwal *et al.*, 2016)**. It may have a role in decreasing lipid peroxidation in vivo, as well as some aromatic and medicinal plants, have demonstrated their antioxidant properties **(Lado *et al.*, 2004)**. Increased total phenol and antioxidants in the liver with decreased MDA concentration may improve health status and reduce the possibility of infectious diseases in broilers **(Salami *et al.*, 2016)**. Our results agree with the results of **Vispute *et al.* (2019**), which indicated that there were no significant differences in the concentration of total protein, albumin and globulin when adding dill seeds 0 and 0.3% at 42 d of age. Our results agree with the results of **Vispute *et al.* (2019)** as it showed that there were no significant differences between treatments at the concentration of ALP enzyme by 0, 0.3% at the age of 42 d . While our results do not agree with the enzymes AST, ALT.

CONCLUSIONS

There was a significant improvement in some of the studied physiological traits of the birds that added dill seeds in their diets such as triglycerides, very low-density lipoproteins and malonaldehyde (MDA) enzyme, wheal, it was significant increase in high-density lipoproteins.

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